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S P E C I F I C A T I O N

ENHANCED AUCTION MECHANISM FOR ONLINE TRANSACTIONS

BACKGROUND OF THE INVENTION

Priority Claim

This application is a Continuation-In-Part of co-pending application serial no. 09/642,078, filed August 18, 2000.

1.   Field of the Invention

This invention pertains generally to online transactions. More particularly, the invention is an auction system and method suitable for use with online transactions which provides a plurality of enhanced auction mechanisms which may be used alone or in combination with the others. The present invention

5   augments and enhances current auction schemes to provide a more entertaining and useful online transaction environment.

2.   The Prior Art

The use of the global information network known as the Internet as medium for carrying out sales transactions (i.e., online transactions) is known. The

10   popularity of the Internet with home and business computer users has provided a market opportunity to provide transaction mechanisms for such Internet users.

Retailers, for example, have launched "online catalogs" via Web pages as an alternative (or additional) means for selling their products or services to their customers.

Recently, online auctions have also gained popularity with Internet users. For example, web sites such as Ebay® and Ubid® provide conventional auction mechanisms, which allow sellers and buyers to engage in auction transactions. Current auctions are defined by a set of participants (sellers and buyers), a set of legal moves (namely, bidding moves and message exchanging moves) for the participants, one or more rounds of moves, each round followed by revelation of information (e.g., current highest bid, current bidders, highest bidder), and a stopping rule, which terminates any further bidding moves and clears the auction.

As noted above, the only legal moves provided by current auction schemes to participants include bidding moves (bids) and message exchanging moves. A bid submitted by a bidder for an item commits the bidder to pay some monetary amount if a given outcome occurs, the outcome resulting when the bidder is the highest bidder with a bid amount satisfying the seller's reserve (minimum) bid amount. Other than bids, the only other legal moves provided to participants in current auction schemes are message exchanging moves (i.e., "cheap talk"), which are payoff-irrelevant exchanges of messages among participants. For example, a bidder may send an email to the seller inquiring into the description (requesting a picture, for example) of the item for sale by the seller.

In general, bids affect the information revelation and the relevant outcome. On the other hand, message exchanges only affect information revelation. The current auction schemes, however, provides the participants with relatively few options and provides an uninteresting transaction scheme.

Accordingly, there is a need for an enhanced system and method for carrying out online transactions and auctions using a plurality of enhanced auction mechanisms which make available a plurality of auctions moves and auction schemes, usable together or separately, to thereby enhance and augment

5   the online auction process. The present invention satisfies these needs, as well as others, and generally overcomes the deficiencies found in the background art.

BRIEF DESCRIPTION OF THE INVENTION

The present invention is an auction system and method for online

10   transactions using an enhanced auction mechanism module. The online auction system comprises an interface module operatively coupled for communication with a transaction module. A mechanism module is further coupled for communication with the transaction module.

In general, the auction system is embodied in software which operates and

15   executes within an auction server, or other conventional data processing means. The auction server is operatively coupled for communication with at least one client node via a conventional network connection, such as the Internet. Participants (sellers and buyers) of the system communicate with the auction system via one or more of the client nodes using a conventional client application

20   providing a user-interface, such as a web browsing application.

The interface module provides an interface between participants of the online transaction systems. In particular, the interface module manages communication requests from the participants (sellers and bidders) of the system as described more fully below. Communications for auction transactions received

by the interface module are communicated by the interface module to the transaction module for further processing.

The transaction module manages transactions associated with moves made by the participants of the system, such as when a seller lists an item for sale, or 5 when a bidder places a bid on an item or carries out some other auction related transaction.

The mechanism module defines a plurality of auction rules which dictate the operation of transactions as carried out by the transaction module. The present invention provides a mechanism module with one or more enhanced 10 auction modules. As described more fully below, the enhanced auction modules extend, augment or otherwise enhance various auction elements including, for example, temporal negotiations, bundled-based auctions, tournament auctions, team auctions, conversion auctions, and bargain market auctions among others. In addition, the enhanced auction modules may be used separately or together 15 during the auction process.

The invention further relates to machine readable media on which are stored embodiments of the present invention. It is contemplated that any media suitable for retrieving instructions is within the scope of the present invention. By way of example, such media may take the form of magnetic, optical, or 20 semiconductor media. The invention also relates to data structures that contain embodiments of the present invention, and to the transmission of data structures containing embodiments of the present invention.

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BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be more fully understood by reference to the following drawings, which are for illustrative purposes only.

FIG. 1 is a functional block diagram depicting an illustrative auction system in accordance with the present invention.

FIG. 2 is a functional block diagram depicting an illustrative mechanism module in accordance with the present invention.

FIG. 3 is a logical flow diagram depicting the operations of a temporal auction process in accordance with the present invention.

FIG. 4 is a graph depicting an illustrative relationship scheme between price and time in descending bid auctions in accordance with the present invention.

FIG. 5 is a functional block diagram depicting the states of items for auction/sale according to interleaving auctions in accordance with the present invention.

FIG. 6 is a logical flow diagram depicting the processes of a sequential bidding auction scheme in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

People of ordinary skill in the art will realize that the following description of the present invention is illustrative only and not in any way limiting. Other embodiments of the invention will readily suggest themselves to such skilled people having the benefit of this disclosure.

Referring more specifically to the drawings, for illustrative purposes the present invention is embodied in the apparatus shown FIG. 1, 2, 4 and 5 and the

method outlined in FIG. 3 and 6. It will be appreciated that the apparatus may vary as to configuration and as to details of the parts, and that the method may vary as to details and the order of the steps, without departing from the basic concepts as disclosed herein. The invention is disclosed generally in terms of

5   online auction system, although numerous other uses for the invention will suggest themselves to people of ordinary skill in the art.

Referring first to FIG. 1, there is shown a functional block diagram of an illustrative auction system 10 in accordance with the present invention. The auction system 10 operates within a network server 12 which can be any

10   standard data processing means or computer, including a minicomputer, a microcomputer, a UNIX® machine, a mainframe machine, a personal computer (PC) such as INTEL® based processing computer or clone thereof, an APPLE® computer or clone thereof or, a SUN® workstation, or other appropriate computer.

Server 12 generally includes conventional computer components (not

15   shown), such as a motherboard, a central processing unit (CPU), random access memory (RAM), hard drive, display adapter, other storage media such as diskette drive, CD-ROM, flash-ROM, tape drive, PCMCIA cards and/or other removable media, a monitor, keyboard, mouse and/or other user interface means, a modem, network interface card (NIC), and/or other conventional input/output devices.

20   The server 12 has loaded in its RAM a conventional server operating system (not shown) such as UNIX®, WINDOWS® NT, NOVELL®, SOLARIS®, LINUX or other server operating system. Server 12 also has loaded in its RAM web server software (not shown) such as APACHE®, NETSCAPE®, INTERNET INFORMATION SERVER™ (IIS), or other appropriate web server software

25   loaded for handling HTTP (hypertext transfer protocol) or Web page requests.

In accordance with the invention, auction system 10 comprises an interface module 14 operatively coupled for communication with a transaction module 16, and a mechanism module 18 operatively coupled for communication with the transaction module 16, each of which are discussed in more detail below. The auction system 10 is normally embodied in software executed by the server 12 and carrying out the operations described further below, although the auction system 10 may alternatively be embodied in circuitry which carries out the operations described herein by the auction system 10.

Server 12 is operatively coupled for communication to at least one client node 20a, although typically Server 12 will be coupled to a plurality of nodes (20a through 20n), each operatively coupled for communication with the auction system, 10, as shown in FIG. 1. Each client node 20a through 20n, like server 12, preferably comprises a standard computer such as a minicomputer, a microcomputer, a UNIX® machine, mainframe machine, personal computer (PC) such as INTEL®, APPLE®, or SUN® based processing computer or clone thereof, or other appropriate computer. Each client node 20a through 20n also includes typical computer components (not shown), such as a motherboard, central processing unit (CPU), random access memory (RAM), hard disk drive, display adapter, other storage media such as diskette drive, CD-ROM, flash-ROM, tape drive, PCMCIA cards and/or other removable media, a monitor, keyboard, mouse and/or other user interface means, a modem, network interface card (NIC), and/or other conventional input/output devices. Each client node 20a through 20n also has loaded in its RAM an operating system (not shown) such as UNIX®, WINDOWS® 98 or the like. Each client node 20a through 20n further has loaded

in RAM a Web Browser program (not shown) such as NETSCAPE®, INTERNET EXPLORER®, AOL®, or like browsing software for client computers.

Each client node 20a through 20n is normally embodied in a conventional desktop or "tower" machine, but can alternatively be embodied in a portable or "laptop" computer, a handheld personal digital assistant (PDA), a cellular phone capable of browsing Web pages, a dumb terminal capable of browsing Web pages, an internet terminal capable of browsing Web pages such as WEBTV®, or other Web browsing devices.

Each client node 20a through 20n is networked for communication with server 12. Typically, a client node is operatively coupled to communicate with server 12 via the Internet through a phone connection using a modem and telephone line (not shown), in a standard fashion. A client node may alternatively be coupled to server 12 via a network (e.g., LAN, WAN, etc.) connection. It will be apparent to those skilled in the art having the benefit of this disclosure that alternative means for networking clients 20a through 20n and server 12 may also be utilized, such as a direct point to point connection using modems, satellite connection, direct port to port connection utilizing infrared, serial, parallel, USB, FireWire/IEEE-1394, and other means known in the art. Generally, client nodes 20a through 20n and server 12 communicate using the TCP/IP (transfer control protocol/internet protocol). However, other protocols for communication may also be utilized, including PPTP, NetBEUI over TCP/IP, voice-based protocols, and other appropriate network protocols.

While depicted as a single computer for purposes of disclosing an exemplary embodiment of the present invention, server 12 may comprise a

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plurality of servers (i.e., a server farm) to provide robust services to the client nodes 20a through 20n, as is known in the art.

As described above, the auction system 10 comprises an interface module 14, a transaction module 16 operatively coupled for communication with the interface module 14, and a mechanism module 18 operatively coupled for communication with the transaction module 16. The auction system 10 is further coupled to a data storage facility or database (DB) 22 wherein data associated with operation of the auction system 10 is maintained. The DB 22 maintains such information as the participants (buyers and sellers), the items for sale, the transactions, among other relevant auction data. Typically such information is maintained by the DB 22 using a conventional relational table scheme although other arrangements, such as a b-tree for example, may also be used for the storage and retrieval of data between the auction system 10 and the DB 22.

The interface module 14 is operatively coupled for communication with the client nodes 20a through 20n, normally via a network connection, such as an Internet connection. The interface module 14 carries out the operation of managing communications between the client nodes 20a through 20n and the auction system 10. For example, the auction system 10 may be configured as a "web" or "http" application, in which case the interface module 14 manages http requests from users of the client nodes 20a through 20n. Accordingly, the interface module 14 provides an interface (e.g., command line user interface, graphical user interface, or voice activated user interface) for auction participants (sellers and bidders) to engage in online auctions via request submitted from the client nodes 20a through 20n to the auction system 10. A request issued by a participant is communicated to the transaction module 16 for further processing.

The results (outcome) of the transaction are communicated as a reply to the user via interface module 14.

The transaction module 16 processes requests from participants of the auction system 10, which are communicated to the transaction module 16 via the interface module 14. For example, when a seller lists an item for sale with the auction system 10, the transaction module 16 manages the bids, messages, or other moves which are carried out by the participants as part of the auction process. The transaction module 16 also manages such auction events as the selection of bidders, the beginning and ending of rounds of moves, the information revelation, and the clearing of the of auctions, for example. As described further below, the mechanism module 18 defines the rules used by the transaction module 16 for carrying out its transactions.

The transaction module 16 is coupled with the DB 22 for storage and retrieval of auction related data. For example, the DB 22 maintains seller data, buyer or bidder data, auction item data, transaction (bids, messages, games, etc.) data, and other auction relevant data. The structure of DB 22 may comprise any suitable format for data storage and retrieval such as a relational table, for example.

The transaction module 16 is operatively coupled for communication to the mechanism module 18. The mechanism module 18 defines one or more auction rules which dictate the operation of transactions as carried out by the transaction module 16. The present invention provides a mechanism module with one or more enhanced auction modules, each defining rules of auction operation. In general, the enhanced auction modules extend, augment or otherwise enhance various auction elements including, for example, the selection of participants, the

grouping of participants, the moves made by participants, the bidding process of the participants, the information revelation process, the auction closing process, and the auction clearing process, among others. In addition, the enhanced auction modules may be used separately or together during the auction process to further

5   enhance the auction environment.

Referring now to FIG. 2, as well as FIG. 1, there is shown a functional block of an illustrative mechanism module 18 in accordance with the present invention. The mechanism module 18 comprises a plurality of enhanced auction modules 30 through 56, each available for auction use separately or together with

10   one or more of the other modules 30 through 56. Each of the auction modules 30 through 56 defines a specific set of rules which dictate the auction operation process.

Auction module 30 provides for "second-price" auctions. According to auction module 30, during the bidding process for an item for sale, only the

15   second-highest standing bid is revealed to the seller at each point in time, while the first-highest bid is kept secret by the auction system 10. At the close of auction for the item, the item is given to the bidder with the highest standing bid, and payment is made in the amount of the second-highest bid. If several ("k") units of the item are auctioned together, then the "k" highest bidders receive the

20   "k" items, but they only pay the amount of the "k+1"-th highest bid. More generally, the second-price module implements the generalized version of the second-price scheme known as the Vickrey-Clarke-Grove scheme. In "reverse" auctions, sellers may place "sale" offers (i.e., offers to sell an item for a given price). In this case, only the second-lowest price is revealed to the buyer. At the

25   close of auction, the seller with the lowest standing offer is awarded the sale,

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however the buyer pays the second-lowest price for the item. This "second-price" arrangement promotes truthful bidding (i.e., bidding the full monetary value of the item) and generally increases the economic efficiency of the transaction.

5   Auction module 32 provides for "temporal" auctions. According to module 32, each bid for an item not only specifies a monetary amount, but also an expiration event. That is the bid is valid (i.e., commits the bidder) until the expiration event occurs. Additionally, the seller may stop the auction at any time, at which point the item is sold to the bidder with the highest standing bid. The

10   expiration event may be conditioned on various events, generally which are outside the control of the bidder. For example, the expiration event may be a specified date and time. In another example where several temporal auctions are run in parallel, the expiration of a bid in one auction can be made contingent on the outcome in another auction. Once the expiration event occurs, the bid

15   expires and is no longer "standing". That is, the bidder is not further committed to purchase the item once the bid has expired. This arrangement provides the advantage that a bidder may bid on many similar items (in parallel), but also make sure that the bidder only is committed to one of the items. Another advantage with temporal auctions is that the expiration events may be hidden from the seller,

20   thereby encouraging the seller to close the deal to prevent standing bids from expiring. According to the present invention, the expiration condition may be left "empty," meaning that the bidder may be able to retract his bid at any time before the seller decides to accept it.

        FIG. 3 depicts a logical flow diagram depicting the operations of an

25   illustrative temporal auction process in accordance with the present invention.

The auction process starts (box 100) when an item is listed for sale by a seller (box 110). After the item is listed for auction, the "rounds of moves" begin (box 115 through diamond 160).

During the "rounds of moves" phase of an auction the participants may engage in various legal "moves" as defined by the mechanism module (module 32, in this example). FIG. 3 illustrates such conventional moves as "other moves" (box 115). Box 130 is carried out after box 115.

At box 120, in addition to conventional auction moves (e.g., message exchange) as noted above for box 115, bidders may place bids with expiration conditions. Such conditions may be that the bid expires at a certain date or time. The bidder may also indicate that the bid is contingent on the outcome of another auction. Other such conditions may be placed by the buyer. Box 130 is then carried out.

At box 130, the auction information may be revealed to the participants of the auction. Such information may include such data as, the highest standing bid, the highest standing bidder, for example. Diamond 140 is then carried out.

At diamond 140, the transaction module 16 determines whether the expiration event has occurred for current standing bids. If so, box 150 is carried out, otherwise diamond 160 is then carried out.

At box 150, the expiration condition has occurred for a standing bid. Accordingly, the bid is now cancelled and no longer commits the bidder to the transaction. Diamond 160 is then carried out.

At diamond 160, the transaction module 16 determines whether an end of auction event has occurred for the current item for sale. For example, the item may have a specified time limit which has expired. Another example of an end of

auction event is when the seller "closes the deal" and ends the auction. When an end of auction event occurs, the rounds of moves phase completes and box 170 is then carried out to clear the auction. Otherwise, moves continue with either box 115 or box 120. It is noted that this process described herein and depicted in FIG. 3 is only exemplary and other embodiments of the move 32 may be used in accordance with the invention.

Referring again to FIG. 2, as well as FIG. 1, auction module 34 provides for "temporal" negotiations. In temporal negotiations, bidders and sellers submit "bid" and "sell" temporal offers respectively. Each temporal offer can be made conditioned on some expiration event, as described above for temporal auctions (module 32). Here, the seller may "close the deal" any given time, at which point the item is sold to the bidder with the highest standing bid. Additionally, the bidder may "close the deal" at any given time, at which point the item is bought from the seller with the lowest standing offer. This procedure may lead to significant efficiency gains, especially in its second-price embodiment (i.e., when coupled with the second-price mechanism 30). In fact, it associates the flexibility of temporal offers (which allow, for instance, to make offers for many substitute goods in parallel) with the efficiency of the second-price scheme (which creates incentives for truth-revelation on both sides).

According to the present invention, in temporal negotiations both sellers and buyers can make several offers guaranteeing that once one is accepted the others are removed. For example, a buyer can make offers for several goods with the request of obtaining only one; once one of his/her offers is accepted, the system will take care of removing the others. A seller may either specify an ask price for goods, or specify specific counter-offers for bids he has received from

different potential buyers. As in temporal auctions, offers (and counter-offers and ask prices) can have expiration conditions; in the case of an "empty" expiration condition a seller/buyer may retract his offer (or counter-offer or asking price) at any time before it is satisfied.

5   The temporal negotiation module supports a bartering capability. As part of an offer a bidder may specify goods that he/she puts for sale as part of his/her bid. Combinations of monetary payments and bartering are also supported. For example, a seller who puts goods for sale may offer it, augmented with a payment of $50, in exchange for goods offered by another participant. This offer may be

10   combined with other substitute offers of this kind or ones that include only monetary payments. Expiration dates may also be specified as before. Notice that in the case of offers that include a bartering option, sellers/buyers will need to choose which of the offers for particular goods they wish to accept, since there is no general numerical ordering of these offers.

15   Auction module 36 provides for "descending bid" auctions. In descending bid auctions, the sale price for an item decreases with time at a predetermined rate, normally determined by the seller. FIG. 4 depicts a graphical representation 60 of the relationship between the bid price and time. The slope 62 representing the auction price set to an initial value at point 64, which

20   corresponds to price p0 (70) at time t0 (74). The slope 62 terminates at point 64, which corresponds to price p1 (72) at time t1(76). As the auction opens, the price for the item begins at p0 (70) and over time declines to p1 (72). The p1 (72) price generally corresponds to the seller's "reserve" price. It will be appreciated that slope 62 is only exemplary, and that various other (non-linear) slopes may also be

25   used.

A bidder may place bids at any time (between t0 (74) and t1(76)) at the current price, at which point the item is sold at the current price. For multiple items, the price may continue to decline until all items are sold or the reserve price is reached. It is noted that the seller may place a reserve price which is the lowest

5   amount the seller is willing to sell the item. In such a case, p1 (72) will be greater than zero (0).

In a case where this module 36 is combined with the second-price auction module 30, the first bidder wins the auction when a second bidder places a second (lower) bid; in this case, the bidder pays the sale price at which the second

10   bidder bids.

Referring again to FIG. 2, as well as FIG. 1, auction module 38 provides for aggregated combinatorial auctions. In general, the module 38 provides a process wherein different auctions, by different sellers, are aggregated in order to yield a unified combinatorial auction. According to this module 38, sellers register their

15   goods until a specified date (Date 1). These goods are sold together (aggregated) in one big auction which ends on a second specified date (Date 2). From date 1 to date 2, bidders submit bids for any of the goods, while specifying when certain goods are "substitute" and they only wish to obtain a predetermined amount (e.g., one item). On date 2, the auction closes and the market is cleared. This

20   scheme provides the advantage of allowing for bids on combinations of items, even though the items may be put on sale by different sellers. In turn, the combinatorial bids provide better deals for buyers who have an interest in acquiring several items in conjunction.

Auction module 40 provides for "preference" auctions. According to

25   preference auctions (module 40), preference auctions generally involve "sealed"

(hidden) bids for substitute goods. In particular, a bidder, when placing a bid for an item, specifies the bid price and the preference (priority) value for the item. Subsequently, when the bidder places additional bids for "substitute" items, the bidder may specify the price and preference value for such additional items,

5   thereby creating a ranking hierarchy for each bid placed.

At the close of the auction, auction module 40 further provides an allocation algorithm to close the auction items according to bid price and ranking. Namely for each item, the highest bidder wins. However, a bidder may potentially be the highest bidder in two or more substitute items. In this case, the allocation

10   algorithm provides that the bidder only wins the highest rank item. The bids for the lower ranked items are cancelled. Under this arrangement, the auction module 40 provides for a substantially more efficient and profitable auction environment over the prior art auction model. After allocation of the items is completed, the auction is cleared.

15   Auction module 42 provides for enhanced "quantity-based" auctions. According to module 42, the purchase prices are determined by the total quantity of items sold. More particularly, the price for an item is determined not only by the total sales of that item, but also by the total sale of other related goods. That is, price for items in the auction can be made functional on the total quantity sold.

20   For example, once the total number of sales for video cassette records (VCR) have reached a certain threshold, the price for televisions (TV) drops by predetermined amount. As more VCRs are purchased, the price for TVs accordingly decrease. In this way, the sale price is inversely proportional to the number of bids received for said goods. According to one implementation, the seller may provide a table of

25   prices, wherein the prices for each item are specified according to the number of

bids received. During the auction, the sale price for each item for auction is set according to the number of bids received. Additionally, bidders may use "proxy" (conditional) bids which commit the bidder only if a certain condition occurs, such as, if the price of a bundle drops below a certain threshold.

5   Auction module 44 provides for enhanced "bundle-based" auctions. According to module 44, a "bundle" is sold when the total revenue for the bundle reaches some predetermined reserve price, which may be hidden or revealed. Under this scheme, a seller may list two or more items (i.e., a "bundle") and indicate a reserve price for the entire bundle. That is, the seller provides a

10   "shared" reverse price, so that when the bids for the individual items are added together, the sum satisfies the "shared" reserve price, the bundle is then sold. In general, if the "shared" reserve price is not met, none of the items in the bundle are sold. The system also supports the clearing of the auction under other conditions, such as that a pre-determined clearing time has arrived. Here again

15   the items will be sold only if the sum of bids for them is greater or equal to the shared reserve price. Extensions of that condition, which enable selling only a subset of the items are discussed below. Another modification supported by the system is to allow the seller to modify (and in particular decrease) the shared reserve price if the bids of the agents did not meet it, while supplying an

20   appropriate message to the bidders.

Although not required, the seller may further elect to provide individual reserve prices for each item in the bundle individually. In this case, a seller is able to sell those individual items that satisfy the item's reserve price, even though the entire bundle does not satisfy the "shared" reserve price. Furthermore, the seller

25   may also specify reserve prices for subsets of the items, and in particular ask that

the reserve price for a subset of the items will be the sum of the reserve prices for the individual items in that bundle. In the case where the reserve price for every set of items is the sum of the reserve prices for the individual items it consists of,

5   the system supplies an algorithm for maximizing the number of goods that are sold, given the constraint that the revenue obtained from the set of sold goods is at least as high as the reserve price for that set. The auction scheme provided by module 44 provides an advantageous means for a seller to liquidate a plurality of items.

Auction module 46 provides for "interleaving" auctions. In interleaving

10   auctions, an item for sale is periodically "featured" for a predetermined interval of time. After the interval, the item returns to a "normal" or non-featured state. Should a bidder place a bid for an item while it is "featured" a discount is associated with the bid. In the preferred embodiment, the bidder is also required to show awareness of the fact that the item is currently featured in order to get

15   the discount. For example, the bidder may be required to provide a "feature number" associated with the item. Subsequently, should the bidder win the auction (normally by placing the highest bid), the bidder receives the discount.

An item may be featured according to a random event by a random number generator which selects an item, or an item may be periodically cycled as a

20   "featured" item according to a predetermined interval. Interleaving auctions, in general, encourage potential buyers to monitor the site to determine when an item they are interested in becomes "featured" to thereby obtain a discounted sale price. Accordingly, an auction site providing the features of interleaving auctions may generate more traffic (and thus revenue) over those auction sites without

25   interleaving auctions.

FIG. 5 illustrates the cycling process 200 of auction items according to auction module 46. Items for sale are generally either in the "normal" state 210, where no rebate is generally provided for bids received during this state. At periodic intervals, the items in this pool may be featured (state 220), where a

5   rebate is provided for bids received during this state. It is noted that items may be featured in parallel and/or sequentially with other items in the pool.

It is further noted that the present "featured item" scheme differs from conventional "featured item" schemes which simply highlight an item to draw attention to bidders without providing a discount or which periodically cycles

10   from "normal" to "feature" mode.

Auction module 48 provides for "reverse payment" auctions. According to module 48, an auction is presented for a plurality of identical items. If there are "k" number of items, there will be "k" number of winning bidders. Additionally, the highest bidder receives a rebate (or discount) to the sale price of the item. In

15   the preferred embodiment, the rebate amount is such that the highest bidder will ultimately pay less than the lowest bidder. Since the highest bidder pays less than the other winners, this mechanism stimulates competition among bidders to be the highest bidder. Other rebate amounts may also be used to encourage bidding competition.

20   Module 48 is suitable for use with conventional auctions where the highest bid amount is disclosed. Alternatively, module 48 may also be configured to disclose only the second highest bid amount, thereby making competition for the highest bid more challenging.

Auction module 50, provides for "conditional" auctions. In conditional

25   auctions, an external event may be tied to auctions sales, such that the occurrence

of an external event outside the control of the participant may be used to influence the auction terms (e.g., allocation and payment). For example, the sale price for an item may be conditioned on stock market prices, or city temperature, for example. Alternatively, the final allocation of the item may be subject to the

5   occurrence of an external event. For example, a predetermined, publicly disclosed condition may be attached to the item for sale; at the close of the auction, the highest bidder receives the auctioned item if, and only if, the external condition is verified.

Auction module 52 provides for "auctions with price-warranty".

10   According to module 52, a seller may list an item for sale with a "price-warranty". In this case, the seller warrants that if an identical item is sold (auctioned) subsequent to the present auction for the item at a price lower than the sale price for the present auction, the buyer will receive a rebate. The rebate amount is normally the difference in value between the original sale and the subsequent

15   sale. Normally, the subsequent sale must fall within a specified time (e.g., thirty days) of the original auction to qualify for the rebate.

Auction module 54 provides for "sequential bid" auctions. According to module 54, the bidding process follows a two-phase process as depicted in FIG. 6. Process 300 initiates the auction process for the item, when the item is listed

20   for sale by the seller. Box 310 follows process 300.

At box 310 (the rebate request phase), bidders submit or request a rebate amount (to the sale price) for the item for sale. According to the scheme of module 54, the rebate amount requested by each bidder determines the order in which bids are received during the second phase (box 320) which is then carried out.

At box 320 (the bidding placing phase), participants submit bids in the order given by their requested rebate such that a participant who requested higher rebates bid before participants who requested lower rebates. In general, participants who bid after other participants are aware of the previous participant bids. Box 330 is then carried out to provide allocation of the sale and clearing of the auction using conventional allocation and clearing means.

This auction scheme enables participants to explore the spectrum between obtaining information about other bids and obtaining a user-defined rebate amount on the participant's bid, should the participant win.

Auction module 56 provides for "tournament" (or "survival") auctions. According to auction module 56, a plurality of items, M items, are sequentially auctioned in "n" consecutive rounds of bidding where Mi items are auctioned in round i. At the end of each round of bidding only a pre-specified number of the highest bidders is allowed to proceed to the next round, while the remaining bidders are excluded from participation in the remaining rounds. For example, module 56 may provide that only a certain number of bidders "survive" to the next rounds of bidding. Alternatively, module 56 may provide that a certain number of current bidders are excluded (i.e., do not "survive") from participation in the next rounds. Other arrangements for limiting the number of bidding participants for successive rounds may also be used with this module scheme.

Additionally, the Mi highest bidder at the end of round i receives the item offered for sale at that round. In one embodiment of auction module 56, all bidders pay the amount of their bids at each round regardless of whether they receive the item or not. This arrangement allows a bidder to compete strategically

for a sequence of similar or dissimilar items, and provides for a more entertaining and challenging online transaction environment.

In another embodiment, a participant will pay only his/her own bid if she/he is among the highest bidders in the last round, and a participant's bid in a

5   round must be at least as high as his/her bid in the previous round. Notice that the above does not preclude a situation where no items are auctioned in a particular round, and that other embodiments of the bidding and clearing rules are supported by the system.

Auction module 58 provides for "team" auctions. According to auction

10   module 58, the participants in an auction are partitioned into teams. The bids of members in a team are aggregated in order to determine the bid of that team. The clearing phase of the auction will determine a winning team based on these aggregated bids. The bids made by the individual bidders can serve in order to determine the allocation of goods/prizes for the teams.

15   As an example, consider the tournament auctions provided by auction module 56. By adding module 58, a participant may be able to decide in the beginning of the tournament of one among many (k) announced teams he may wish to belong to. The bids of the participants that have chosen a particular team will be summed up in order to determine the team's bid in a round. Only some of

20   the teams will be able to make it to the next round, based on tournament rules for the teams. The team winning the tournament will be allocated a prize. Notice that the team auction module can be incorporated in order to enhance arbitrary auction modules. Module 58 supplies a novel way for enabling group bidding, and on-line bidding communities, that both cooperate and compete in a

25   generalized auction setup.

The partitioning of participants into teams may be based on their self-selection, or based on a system's process for the partitioning of participants into teams. Teams may be static during the whole auction process, or may be dynamic (e.g. participants whose teams have been dropped from a tournament, may be able to choose another team to support). Bids can be aggregated in various ways. For example, bids can be summed up to determine the team's bid, the average of bids in the team can be computed in order to determine the team's bid, and the like.

Auction module 60 provides for "conversion" auctions. According to auction module 60, the seller of a set of items employs an algorithm for the dynamic calculation of a reserve price of each item and/or for each set of items. The algorithm determines the reserve prices based on the bids of the participants, information about who among them may become first time buyers (if their bids are accepted), and the monetary benefit in having a participant becoming a first time buyer (by winning goods he bids on). The algorithm optimizes the benefit to the seller, by integrating conversion benefits into the computation of an optimal reserve price having the agents' bid, without differentiating among users: in no case can agent A win goods while agent B does not win the same goods, while agent B's bid for those goods was higher than agent A's bid for those goods.

As an example, consider a sealed bid auction for several units of a single type of goods, where the numbers of units available is not communicated to the users. Assume that the benefit from converting a customer is evaluated at a sum of $X, and the seller is interested in getting a benefit of at least a sum of $Y, for each unit of goods. Given the agents' bids, an optimal reserve price can now be computed; this reserve price will take into account the fact that by winning a unit

of goods by a first time buyer who will pay a sum of $K, the actual seller's gain is $(K+X). Notice that the reserve price, determination can not be simply implemented by adding $K to the bids of potential first-time buyers, given the condition on no price differentiation.

5   In addition to having monetary benefits associated with the conversion of a participant into a buyer, the algorithm for dynamic reserve price determination incorporates a general specification of the value obtained by allocating goods to a particular participant. For example, monetary benefit can be associated with the allocation of goods to a participant who has not bought anything for a while.

10   This general specification will take into account determining the reserve prices given the agents' bids, while keeping the no price differentiation requirement.

Auction module 62 provides for "bargain market" auctions. According to auction module 62, the bargain market runs continuously. At each point in time a seller may put goods for sale and may put an ask price for those goods. At each

15   point in time a buyer may offer bids for several goods, and declare he/she wishes to get only one of them. At each point in time a seller may decide to accept an offer. When a seller accepts an offer the other offers for the goods are removed. In addition, the moment the bid price is greater than or equal to the ask price for the goods, the goods will be sold to the corresponding buyer. The moment goods are

20   sold to a buyer all the substitute offers of this buyer are removed.

The seller may change his/her ask price at each point in time (before the goods are sold). A buyer may retract his/her bid at each point in time (before the goods are sold). A buyer may put an expiration date for his/her offer. The seller may put for sale many units of the same goods.

In the basic form of the bargain market the bid price will mention the maximum quantity requested and the price per unit the seller ask price will be for a price per unit, and he/she may decide on a particular point in time to sell a subset of the units.

5   Combinatorial bidding is also supported in the bargain market. As an example, consider selling a set of goods by a seller, where bids can refer to bundles of goods (as in combinatorial auctions). In this case the system will be able to present to the seller the revenue he/she may obtain by selling any subset of the goods. A seller can also put substitute goods for sale. In this case,

10   whenever goods are sold all substitutes will be removed from the system.

The offers made by participants may be hidden or open. In addition, in a sealed version, the bargain market supports an implementation where only the second-highest offer is revealed to the corresponding seller.

The bargain market also incorporates and supports a barter

15   mechanism/market, where a seller may specify that he/she may wish to get other goods (introduced to the system by another seller), and potentially add to it a complementary monetary offer. This will be taken as another form of bid. Again, this bid may have substitutes. The moment such an offer is accepted, the substitute offers will be removed.

20   For example, if seller X offers a barter exchange with seller Y, augmented with a monetary payment of p from X to Y, and seller Y offers a barter exchange with X with a monetary payment of q from X to Y, where p >= q, then X and Y will be matched (and substitute offers will be removed, and the like).

The barter market mechanism mentioned above also supports one to one, one

25   to many, and many to many capabilities. Periodic and continuous clearing

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capabilities are also supported. A combinatorial barter is also supported by the barter market mechanism. In a combinatorial barter the basic offer has the following structure; S1 XOR S2 XOR....Sn for T1 OR T2 OR...Tm., where the Si's and Tj's are sets of goods or monetary transfers. The case where other

5   Boolean operators are used are supported as well, (e.g., the case where there is a combined XOR/OR logic).

The barter market also supports optimal matching for the case where a market is periodically cleared and where participants specify exchanges they are interested in (combining offers to exchange goods with monetary transfers). For

10   example, an algorithm for finding exchanges that there will be no pair of people that will prefer to exchange with one another rather than with their assigned partners. Optimal circular matching can also be supported. Optimal circular matching involves finding maximal circular barters.

While modules 30 through 62 of the mechanism module 18 may be used

15   separately to drive the transaction module 16 in carrying out its transactions, the modules 30 through 62 may be combined with one or more of the other modules to provide further combinations and extensions to the auction environment to the participants.

Accordingly, it will be seen that this invention provides an online auction

20   system which provides a plurality of extensions to various auction elements. The present auction system provides additional participant entertainment, efficiency, and profitability not present in conventional systems. Although the description above contains many specifics, these should not be construed as limiting the scope of the invention but as merely providing an illustration of the presently

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preferred embodiment of the invention. Thus the scope of this invention should be determined by the appended claims and their legal equivalents.